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# THE AMERICAN ANTHROPOLOGIST

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## PRIMITIVE MAN<sup>1</sup>

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All systems of cosmogony attempt to account for the beginning of man; all history tries to direct its gaze backward to descry as much as possible of that which is hidden within the night of time. This attempt is a natural one, an instinctive recognition of the cardinal principle of history—that to understand what we are we must know what we have been.

It is only within the memory of those still living that our inquiries as to primitive man have assumed a form that may be properly called scientific, the earlier views being mainly of speculative or theological character. Lyell's great work on the Antiquity of Man was published in 1863, and it was not until 1871 that Darwin's *Descent of Man* appeared. These treatises have profoundly modified all modern thought on this momentous subject. Since their publication there has been gradually accumulating a large mass of evidence of a varied character, all tending to confirm the general conclusions contained in those famous works. I have thought that I could not do better than to review for you some of the more salient facts that have been discovered within the last twenty-five years, and thus bring before you the present condition of the problem of man's origin.

The existence of man in previous ages is supported by two classes of evidence: first, the finding of human remains, and, second, the recognition of human products. In the absence of historical records of any kind, the antiquity of both these classes can only be determined by the geologic horizon in which they

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<sup>1</sup> Annual Address of the retiring President of the Anthropological Society of Washington.

are found, by precisely the same kind of evidence, in fact, as that which we apply to the determination of the age of rocks. It is with reference to the actual remains of the body of man that I shall chiefly speak.

I will ask you to consider for a moment how highly improbable it is that these remains should be found in any considerable quantity. All evidence goes to show that the present civilized state of man was preceded by a savage state similar to that of most primitive peoples of modern times. These peoples wander as nomads over the face of the earth, possessing no fixed habitations, or perhaps live in rocky shelters or in trees. They have no customs of burial which would lead to an indefinite preservation of the remains of the dead. The only chance for such remains to be preserved from the action of the elements or from the rapacity of wild animals is that they shall happen to be encased in sediment or mud, which may keep them from the air and protect them from the water. Such conditions may be met with rarely in the bottom of caverns or along water-courses of either ancient or modern date. Even then a gradual oxidation by the influences of water and air will surely occur, unless the water be charged with some substance, like carbonate of lime, capable of combining with the salts of the bones and changing their chemical composition without injuring their apparent structure. When we consider all the obstacles that prevent the preservation of human remains, we are led to wonder greatly that we find any at all, and to see that the popular idea that they ought to exist in great numbers is based upon an imperfect knowledge of the conditions.

The main result attained by the considerable mass of evidence contained in the great work of Lyell was to show that the period of man's occupation of the earth must be very greatly extended beyond that ordinarily assigned to it. Instead of being limited by a comparatively short space of some 6,000 years, it became clear that if geological data amount to anything we must place the first appearance of man upon the planet back among the geologic periods, vast but somewhat indefinite in their extent. We find fragments of human bones lying intermingled with those of animals long since extinct—with the cave bear, the cave hyena, the mammoth, the hairy rhinoceros. These animals carry us back to nearly the beginning of the quaternary epoch,

to the close of the glacial period, when they inhabited central Europe along the edge of the retiring ice-sheet.

It is evident, then, that there can be no reasonable doubt about the great antiquity and wide diffusion of man. The peculiarity of modern investigation is that it is not directed so much toward this point, which is now acknowledged by all, as to the endeavor to discover what the specific characteristics of ancient human remains may be.

From an evolutionary point of view this is most important. Since in many lines of zoological descent we have been able to show that there has been a gradual differentiation of specific characters, so it might be expected that such would also be the case with the remains of man. About this question the controversial battle has waged most fiercely, every new discovery leading to exhaustive and often acrimonious discussion.

At the time of the publication of Lyell's book the principal discoveries that had been made were those at Cannstadt, at the Neanderthal, and at Engis. The remains at Cannstadt are said to have been found at the beginning of the last century, and consist of a very ape-like skull-cap, which, were the evidence sufficient, would seem to class it with other very early remains. Their authenticity has, however, been questioned, and it is impossible, after this lapse of time, to settle the question definitely.

The famous Neanderthal skeleton fortunately rests under no such cloud. It was discovered, in 1857, in a cave in the valley of a small stream near Düsseldorf, on the same level with bones of the extinct cave bear. The workmen who excavated it, not knowing its value, only saved the larger bones and the cap of the skull. Its characteristics are probably well known to you, as they have often been figured and described. The frontal prominences are enormous, producing a great overhanging supraorbital ridge, entirely unlike anything ordinarily seen in the skulls of today, and reminding one strikingly of the skulls of the higher apes. It was declared by Huxley to be by far the most ape-like skull that had hitherto been discovered. The remaining bones of the skeleton indicated a man of unusually powerful frame.

A very forcible attack was made upon the normal character of this skeleton by Virchow, who pointed out that there are in it unmistakable signs of the rheumatic affection known as *ar-*

*thritis deformans*, and that this not infrequently led, when of a very marked type, to a deformity of the skull similar to that shown in these remains. This statement, made by the great authority of one of the foremost pathological anatomists of the time, has been sufficient to discredit the skull in the eyes of many anthropologists.

The Engis skull, discovered in 1835 near Liège, Belgium, is not of so low a type as that of Neanderthal, and is held by competent anthropologists to belong to a later date. It has, however, decidedly simian characters, being of comparatively low capacity, with heavy supraorbital ridges and large temporal fossæ.

The next significant find was that of a skull, associated with implements and a portion of an elephant tusk, at Olmo, near Florence, in Italy. The geological age is doubtful, the workmanship of the implements indicating that it is of a later date than that of the Neanderthal remains. The skull is, however, similar in character to those previously discovered.

In 1865, at a cave known as La Naulette, on the river Lesse, near Dinant, in Belgium, there was discovered a fragment of a human jaw and a few other human bones associated with bones of the mammoth and the rhinoceros, and in such conditions of stratification as to admit of no doubt as to its geological horizon. This was by far the most ape-like jaw hitherto discovered, being characterized by massive proportions, a retreating chin, a lack of the tubercles on the inner side that give attachment to the muscles of the tongue, and by cavities for the molar teeth that increase in size from before backwards and have large spreading roots. A comparison of this jaw with those of the chimpanzee, of modern savage tribes, and of the modern European shows a gradation of characters that is very significant.

It has been held by some enthusiastic advocate of the doctrines of evolution that the absence on this jaw of marked projections for the attachment of the muscles of the tongue indicates that the man to whom it belonged was not gifted with the powers of speech. A brief examination will show that such a conclusion is hardly justified by anatomical evidence. The muscles of the tongue that effect articulate speech are mainly the so-called "intrinsic" muscles—fibers that pass from side to side and from surface to surface of the organ without attaining to any bony attachment. They would not, therefore, have any effective ac-

tion in modeling the lower jaw. The muscles attached to the prominences in question have little or no action upon speech.

In 1867 there was discovered at Eguisheim, near Strasburg, a skull of a type similar to that from the Neanderthal, in proximity to a tooth of a mammoth and other remains of extinct animals. Unfortunately the skull was rather fragmentary. A similar skull was found at Brux, in Bohemia, associated, however, with implements of palæolithic type. At La Denise, on the Upper Loire, were also discovered fragments of skulls having the same general character.

It was in 1886 that there was found on the bank of the Orneau river, in Belgium, the remains that have become famous as those of the grotto of Spy. These consisted of two skeletons, fragmentary, it is true, but more complete than any hitherto found. They were associated with remains of the cave bear, the cave hyena, the woolly rhinoceros, *Elephas primigenius*, and other extinct animals. The geologic evidence of the age of these fossils is extremely strong, they being separated from any recent formation by a hardened layer above which was a reddish clay covered with the debris of fallen rocks.

These remains served to show that the views of anthropologists in ascribing to the same class the skulls heretofore discovered, the jaw of La Naulette and the other portions of the skeleton were correct. Here were skulls of the Neanderthal type associated with jaws like that of La Naulette and long bones having a curvature like that of the apes. The articular surfaces of the femora and tibiæ were such that it seems probable that the people of Spy did not stand erect, but walked with the knees bent and the head and shoulders thrust forward, as do the higher apes. The bones of the forearm, so curved as to produce a wide interosseous space, suggested the use of the arms for climbing. The relative proportions of the bones of the legs and arms were, however, human. The teeth were markedly simian, the molars increasing in size posteriorly and having divergent roots. The skull had not only the powerful frontal arches but a marked semicircular crest of the occipital region similar to that seen in negritos and in young orangs and gorillas, rarely seen among skulls of modern Europeans.

Not long after the discovery of the "men of Spy" there were found in the pleistocene gravel at Galley-hill, Kent, England, a

human skull with limb bones, together with numerous paleolithic implements and remains of extinct mammals. These bones were identified while yet lying undisturbed *in situ*. The skull was of the Neanderthal type, being extremely long-headed and with an ape-like occiput. The jaw, as far as can be ascertained from the fragment that it was possible to preserve, resembles that of La Naulette.

Skulls and other remains of this ancient type have been found also at Cro-ma Podbaba, near Prague; at Brunn, in Moravia; at Shipka, in the Balkan peninsula; at Predmost, in Bohemia; at Moncilly, Arcis sur Eure, Laugerie Basse, and Mentone, in France.

But it is not only in the old world that ancient human remains have been found. In the pampas of South America and in Patagonia the antiquity of man is attested by finding his remains associated with the great carapaces of the glyptodon. These skulls appear to belong to a later type than that of Neanderthal, being broad-headed and of greater capacity.

The celebrated Calaveras skull of California apparently belongs to this same type. Unfortunately, the authenticity of this skull is somewhat clouded, and the geological history of the strata to which it is referred is not as yet completely made out.

It will be seen from this somewhat hasty survey that notwithstanding the objections made to the remains from the Neanderthal they appear to be typical of a certain stage of human development. It is asking rather too much of us to insist that we shall consider all skulls of this type as either belonging to microcephalous idiots or as resulting from pathological deformity. There appears, then, to be sufficient evidence that during the pleistocene period man was somewhat widely distributed in Europe below the ice-belt, and that he differed from the man of today in anatomical structure, having characters that tend toward a generalized form which it is conceivable may have been the common ancestor of both man and the higher apes.

It may be noted, however, in this connection that the localities hitherto examined were by no means those where the most primitive forms of man were likely to be found. It has been more than once pointed out that if man was really preceded by an ape-like ancestor it is most probable that the transition was effected in the tropical parts of Asia, or perhaps in Lemuria,

that submerged continent which once stretched from Madagascar, on the west, to the Philippines, on the east, and of which Java, Sumatra, and Borneo are important remnants. It was, in fact, from that region that the next and most important evidence of man's ancestry came.

Doctor Eugène Dubois, attached to the army of the Netherlands, was employed in Java from 1890 to 1895 in conducting geological explorations with reference to the fossil fauna of that island, which was known to be very rich. Here, upon the steep banks of the Solo river, at a station known as Trinil, he found a place particularly rich in fossil bones, among which were those of a great mammal resembling both apes and man in such equal degree that they have been most variously interpreted by the most competent anatomists of both this country and Europe.

Dr Dubois believes the remains to have belonged to a creature of an intermediate type which he designates as *Pithecanthropus erectus*.

The stratum in which these bones were found is a soft rock, formed by the cementing together of sand and stones that have been ejected from volcanoes. The remains were completely fossilized and had to be removed from the rock by the use of the chisel and hammer. They were associated with animals now wholly extinct, the Stegodon, the Leptobos, and extinct species of Rhinoceros, Sus, Felis, etc. The geological horizon appears to be unquestionably pliocene—much lower than that in which human remains have hitherto been found.

The remains that have excited so much attention were a skull-cap, a femur, and two molar teeth. The femur was 15 meters from the skull-cap, the molars one and three meters away. All were exactly at the same level and in precisely the same state of fossilization.

The femur has a decidedly human aspect, while the skull-cap and the teeth are remarkably simian in character. This led many anatomists, before they had seen the specimens, to deny that they could possibly have belonged to the same individual. The evidence that they must have done so is, however, very strong. Remains of anthropoids are throughout the world very rare, and those of man are entirely unknown hitherto in this geological horizon. Dr Dubois, during five years' researches in Java, over an area some hundreds of miles in extent, particu-



larly rich in fossils, found but one other specimen that in any way suggested an anthropoid. Yet here are these four detached pieces, one of which is said to be human, the other three anthropoid, found at precisely the same level and under precisely similar conditions, within short distances of each other, distances that are easily explained if we accept the highly probable view that the individual perished in some volcanic catastrophe and was washed down the river, the separate bones of the skeleton thus becoming detached, or perhaps torn asunder by gavials, whose remains are found close at hand in the same stratum and whose tooth-marks are noted on some of the other neighboring bones. It should also be remembered that it is by no means unusual in geological explorations to find bones evidently belonging to the same skeleton detached from each other.

Besides, it may be noted that the femur itself shows some simian affinities. Virchow has remarked upon the straight, candle-like shaft like that of a gibbon. Dubois notes the small area and the convexity of the popliteal surface, features rarely found in human femora. The condyles, as well as other anatomical features, show that the creature must have walked erect or nearly so.

Now the stature of this creature, according to the accepted views regarding the relations of the length of the femur to that of the body, must have been 1.65 to 1.70 meters, or 5 feet 5 inches to 5 feet 7 inches. It is interesting to compare with this the stature of the anthropoid apes. The smallest of these is the gibbon, an animal found by Dr Dubois to have the closest affinity with *Pithecanthropus*, and which, besides, now inhabits adjacent territory. Its largest variety, the siamang, does not exceed 3 feet in height. The orang, also a neighbor, rarely reaches 4½ feet, while the chimpanzee is somewhat taller, not, however, exceeding 5 feet. The gorilla considerably exceeds all the others, and may equal in bulk a large man. His height is not as great as this would imply, but he is usually more than 5 feet tall, and may in exceptional cases reach 5 feet 6 inches. Among extinct anthropoids the best known is the *Dryopithecus* of the south of France, which was probably about the size of a chimpanzee. The stature of *Pithecanthropus* appears, therefore, to have been somewhat greater than that of any known ape. On the other hand, his height was equal to the general average of the present

native inhabitants of the region, the Malays and the Indo-Chinese, and exceeded the average of tribes of least stature among existing men, such as the Veddahs, the Bushmen, the Wambutti of Stanley, and the Akka of Emin Pasha.

The fragment of the skull comprises about the same extent of cranial surface as was preserved in the Neanderthal specimen. While it remarkably resembles that famous relic, it indicates a decidedly inferior cranial capacity and the ape-like characters are more marked. The capacity has been estimated independently by Dr Dubois and M. Manouvrier as about 1,000 cc. This is much beyond that of any known anthropoid ape, but less than that of any normal man of the stature indicated by the femur. It can only be equalled by the skulls of microcephalic idiots.

We are therefore reduced to this dilemma—either the remains belonged to a creature higher in the scale than the existing apes, and yet much lower than man, or they are remarkably abnormal remains of an idiot. But, as Dubois acutely points out, microcephalous idiots are rare, not more than one occurring in a million of inhabitants. How very improbable that just that one should have been found! Another fact that Dr Dubois does not sufficiently emphasize is that these specimens confirm in a most remarkable manner those of Spy and of Neanderthal, all of which have been alleged to belong to idiotic individuals. Now, if the chances are a million to one against discovering a single microcephalic skull, the discovery of three at widely distant localities and in no way associated with each other multiplies the improbability in a geometrical ratio. Again, as there are no remains from these distant geological horizons that are in any way comparable with normal man of today, we are led to the conclusion that in the beginning the human race was composed of microcephalic idiots. It would seem more reasonable to accept the more probable view that there has been a slow evolution of forms from an ape-like ancestor to man of the historical period, and that these low-type skulls are precisely what was to be expected from other evidence of man's primitive habits and condition.

An interesting deduction from the discussion of the Java ape-man is the probability that the erect posture was assumed much earlier than has been supposed. It would appear that it must

have preceded the intellectual development, and perhaps have been one of the conditions that led to it. It is not until the erect posture is assumed that the thoracic limbs are freed from the duty of assisting in locomotion, and thus become adapted to higher uses. No animal that habitually walked on its hands could acquire the use of tools.

The brain is not independent of the rest of the body, exerting a force that primarily shapes and subordinates all other bodily functions. It is itself a product, a result, by the slow process of evolution, first of external stimuli, and then of internal activities. The infant does not learn to walk because its brain tells it to do so, but by experience and trial its hands and feet teach its brain that this is a more effective method of locomotion. In this, as in so many other instances, the history of the infant recapitulates that of the race.

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CANNIBALISM.—In several recent books attempts have been made to study this fearful practice from an ethnological point of view. Captain Webster (*Through New Guinea and the Cannibal Countries*) points out that within a short walk of the houses of civilized traders villages may be found in which slaves are kept for food, and that head-hunting raids are very common. Captain Guy Burroughs (*The Land of the Pigmies*) thinks that it is quite erroneous to suppose that cannibals are the lowest type of mankind. He says that "the unnatural practice stands by itself, seeming not in any way to affect or retard the development of the better emotions. Thus tribes to whom cannibalism is quite foreign are in many cases more bloodthirsty and far less advanced, both morally and socially, than others openly addicted to it. It does not follow at all that, because the natives of the interior evince a liking for human flesh, they are, on the whole, inferior to those who treat the practice with contempt and abhorrence." Mr Herbert Ward (*Five Years Among the Congo Cannibals*) is of the same opinion. In most instances cannibals are a distinct advance over degraded and degenerate tribes like the Pigmies, who never touch human flesh as food. Usually this revolting practice is associated with the fetishistic idea of obtaining the strength and valor of an enemy by eating a portion of his body.